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ETHNOBOTANICAL SURVEY OF COSMETIC PLANTS USED IN KATSINA STATE, FORMULATION OF NATURAL POLY HERBAL LIGHTENING CREAM USING *Curcuma longa* AND *Curcubita pepo* EXTRACTS

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ABSTRACT

This study aimed to conduct an ethnobotanical survey of cosmetic plants in Katsina State and formulate a polyherbal lightening cream using *Curcuma longa* and *Cucurbita pepo* extracts. The Research involved two main aspects. A semi-structured interview was used to gather information on the use cosmetic plants.23 plants were identified including: *Aloe vera, Calatropis procera, Magnifera indica, Carica papaya,Allium cepa*. These plants were found to have various cosmetic benefits such as skin lightening, weight loss, hair treatment, acne treatment. An attempt was made to formulate a safe lightening cream using plants extract *Curcuma longa and Cucurbita pepo*. The formulation process involved: procurement of plants, preparation of the extracts (powdered extracts using Ethanol, cold press method was used for the oil extract). The resulting polyherbal lightening cream was evaluated for its skin related properties, such as skin lightening and skin health. The study demonstrated the potential of medicinal plants in skincare and the possibility of developing effective polyherbal cosmetic pro.

Keywords: *Aloe vera*, Ethanol, skin lightening, medicinal plants

INTRODUCTION

According to the World Health Organization (WHO), 80% of the world's populations uses medicinal plants in the treatment of diseases and in African countries this rate is much higher (WHO 2007) In recent years, however, medicinal plants have represented a primary health source for the pharmaceutical industry. No less than 400 compounds derived from plants are currently used in the preparation of drugs. Nigerians still depend largely on crude herbal remedies or traditional medicine (Katsaya *et al 2006)* They also use wild plants for cosmetics and perfumes, some of these herbal remedies have been observed to be effective in certain skin diseases (Sufiyanu et al 2019)

The use of plants for beauty care solutions dates back to antiquity and various testimonials inform us on the use of plants in beauty care treatment during the ancient period, women used the grounded leaves and seeds of plants on their hair, face and over all body, drunk herbal tonics and oil obtained from herbs for different body massages. These treatments were used during that time in countries like Rome, China and Latin America (Lim et al., 2006). Historically, plants do not only provide human with food but also with means of healing and this has made the use of plant as medicine, as was practiced by our ancestors to be major sources of medicine (Bannister, 2006).

Secondary metabolites have been attributed to most plants therapeutic activities. Since ancient times, women have turned to the beauties of nature to help or increase their own beauty. The concept of beautifying is not restricted to women alone even men have become aware of their looks.

Herbal Cosmetics

Use of plants as herbal medicines has been popular since ancient times. The modern industry of beauty and cosmetics has been also trending toward the use of natural ingredients such as herbal and plant extracts (kumar *et* al.2012), Herbal cosmetics are referred to as natural cosmetics formulated by a wide range of cosmetic ingredients in which herbal extracts compounds play a vital role in treatment of skin problems. There is currently an increase interest of bio-active compounds originated from herbal extracts for the body care formulations due to dramatically increase of consumer expectations worldwide (Chinmay *et al.,2015*)

Generally, herbal extracts are incorporated in the body care cosmetic products to enhance human beauty, their functional features i.e. mildness, efficacy, biodegrability, cleansing ability, emulsification, miniaturization, skin appearance, feel, fragrance and lubrication (*awar et al.*,2015) Therefore, herbal body care cosmetics have become more popular among the population. Poly herbal formulation in the use of more than one herbs in a medicinal preparation. The concept is found in Ayurveda and other traditional medicinal systems where multiple herbs in a particular ratio may be used in the treatment of illness (Daya *et al.,2011)*

Skin Lightening

As the largest organ in human, the importance of protection and nourishment of the skin cannot be overemphasized. Globally, skin diseases remain a public health concern and affects several individuals regardless of their age, sex and gender (Lim et al., 2017). Even though many of the skin diseases have low mortality rate and often treated with existing medications their affordability and efficacies remain a major challenge in recent times (Jean *et al.,2005).*

Skin lightening is a cosmetic procedure that aims to lighten dark areas of the skin. It is usually used to improve the appearance of blemishes such as birth marks, and dark patches (Roger *et al.,* 2014). Skin lightening involves the use of chemical substances in an attempt to lighten the skin or provide an even skin tone by reducing the melanin concentration in the skin. Most people use lightening creams to treat skin problems such as age, spots, acne scars or discoloration related to hormones(Rendon *et al.*,2006).

Skin color is determined by the amount of melanin in the skin. Melanin is a pigment produced by specialized cells called melanocytes(stephanie *et al.*,2023).

MATERIALS AND METHODS

Study Area

This study was conducted in Katsina State, Northern Nigeria.

Katsina State which covers an area of 23,938 sq km, is located between latitudes 11^0 08^1N, and 13^0 22ˆN and longitudes 6 52'E and 9^0 20'E (Figure 1). The state is bounded by Niger Republic to the north, Jigawa and Kano States to the east, Kaduna State to the South and Zamfara state to West. The state has 34 local government areas.

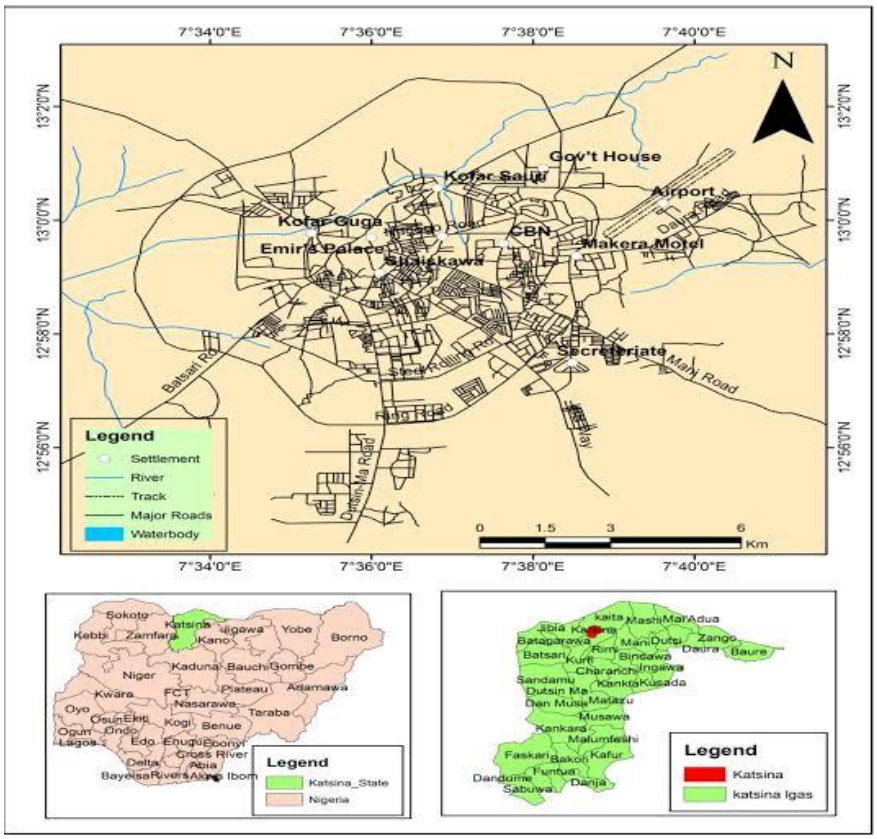

Figure 1: Map of the study area

Katsina State is fifth largest state in Nigeria with over 5,800,000 residents as at 2006 (NPC, 2006). Demographically the Hausa/Fulani people are the largest ethnic-group in the state and Islam is the most practiced religion (Bello, et al 2019). Katsina is known in history as "cradle of learning", it is a centre of both formal and informal education. There have been in existence Islamic schools and other centers of scholarship as far back as 14th century. Katsina State is the home of the legendry Kusugu well and Gobarau minerate. It is the birth place of dynamic leaders, brave warriors, intelligent musicians and singers.

Ethnobotanical Survey

The survey was carried out between December 2021 to January 2023 through a semi-structured interview, questionnaires were given to obtain information on the local names, morphological parts used and part(s) of the body where cosmetic preparations are applied. The interviews were conducted among traditional beauty consultants, beauty consultants, elders, herb sellers and other people who have knowledge concerning the use of plants as cosmetics. Plants mentioned were collected and were identified by comparing with herbarium species.

Data Analysis

The use value indexes of the plants were analyzed by adopting the method of Philips et al., (1994). The family, botanical name, number of citation, common name, local name, morphological parts used, method of preparation were identified.

Use Value (UV)

The use value of species (UV), a quantitative method for evidencing the value of locally known species (Vitalini et a., 2013), calculated according to the following formula:

$$UV = \frac{\Sigma UR}{N}$$

Where UR is the number of use reports mentioned by each informant and N is the total number of informants interviewed.

Plants Materials

The plants were procured from the market shade dried, powdered coarsely. The plants for the study were selected based on the biological action on the skin.

Tumeric (*Curcuma longa*)

Tumeric gets its health benefits primarily because of *curcumm.* A bioactive compound that has anti-inflammatory and anti-oxidant properties. This compound reduces melanin synthesis. It works by inhibiting tyrosinase, thus suppresses the ability of melanocyctes to create more melanin.

Pumkpin (*Cucurbita pepo*)

From the seeds to the flesh pumpkin are loaded with nutrients that helpful for the skin. Pumpkin contains enzymes and alpha hydroxyl acids that break down dead skin cell by removing dead skin cells normal cell regeneration speeds up. Pumpkin contain beta carotene a derivative of Vitamin A, which improve uneven skin tone, resulting in skin lighting.

Preparation of Extracts

Each of the powdered samples of *Curcuma longa* and *Cucurbita pepo* were separately extracted using ethanol. The powder from each samples were macerated in ethanol in containers which were covered to prevent evaporation of the alcohol. The set up was allowed to stand for 24 hours with occasional shaking to obtain maximum extraction. After which the alcohol extract was filtered, the extract was concentrated on a water bath and made to dry in to powdered form.

Preparation of Oil Extracts (Using Cold Press Method)

Freshly grated *Curcuma longa* and *Cucurbita pepo* were separately macerated in olive oil using glass containers. The set up was allowed to stand for a duration of 1 month (4 weeks) with occasional shaking to obtain maximum extraction after which the oil was filtered and stored.

Ethical Approval

Approval (Ref. No. MOH/ADM/SUB/1152/1/541) was obtained from the Ministry of Health Katsina State.

Plate1: *Cucurbita pepo*

Plate 2: *Curcuma longa*

Formulation of Cream 1

Polyherbal cream was formulated by dissolving stearic acid, cetyl alcohol, cocoa butter in the oil phase at temperature of 75^0C. Distil water, vegetable glycerin, extracts of turmeric and pumpkin were dissolved and heated at temperature of 75^0C. After heating the water phase was added to the oil phase with continuous stirring until a homogenous cream was achieved (Mundada *et al.*,2015). The cream was formulated at 3 different percentages

Table 1: Formulation Table showing the excipients used in the cream formulation and their functions.

Excipients	Function
Stearic acid	Emulsifier, emollient and lubricant that can soften skin and help to keep products from separating.
Cetyl alcohol	It helps thicken and add texture to cosmetic product and improves both feel and application.
Glycerin	As a humectant and as a preservative.
Cocoa Butter	Moisturizer.

Table: 2 Formulation Table 2 showing formulations amount of excipients (grams)

F1 (50% *Curcuma longa* extract 50% *Cucurbita pepo* extract)
F2 (75% *Curcuma longa* extract 25% *Cucurbita pepo extract*)
F3 (25% *Curcuma longa extract 75% Cucurbita pepo* extract)
F4 (50% *Curcuma longa* oil 50% *Cucurbita pepo* oil)
F5 (75% *Curcuma longa* oil 25% *Cucurbita pepo* oil)
F6 (25% *Curcuma longa* 75% *Cucurbita pepo* oil)

Excipients	F1 (grams)	F2 (grams)	F3 (grams)	F4 (grams)	F5 (grams)	F6 (grams)
Stearic Acid	10	10	10	10	10	10
Cetyl alcohol	5	5	5	5	5	5
Cocoa butter	5	5	5	5	5	5
Distil water	50	50	50	50	50	50
Vegetable glycerin	10	10	10	10	10	10
Curcuma longa extract	10	15	5			
Cucurbita pepo extract	10	5	15	-	-	-

Curcuma longa oil	-	-	-	10	15	5
Cucurbita pepo oil	-	-	-	10	5	15

Formulation of the Cream 2

Polyherbal cream was formulated by dissolving stearic acid, cetyl alcohol, cocoa butter in the oil phase at temperature of 75^0C. Distil water, vegetable glycerin were heated to a temperature of 75^0C. After heating the water phase added to the oil phase, and the oil extracts of *Curcuma longa*, *Cucurbita pepo* were added with continuous stirring until a homogenous cream was achieved(mundada *et al.*,2015). The cream was formulated at 3 different percentages.

Evaluation of the Cream

Organoleptic properties: The formulated cream was evaluated for its organoleptic properties using pH, odour, colour, washability and appearance.

pH: Cream pH was measured with a digital pH METER.

Wash ability: A portion of cream was applied over the skin of hand and allowed to flow under the force of flowing tap water.

Sensory Determination

Sensory evaluation is based on the measurement and assessment of the cream properties by the senses smell, taste, touch, sight). Testing of the cream was performed by group of respondents (10 females). The respondents were trained and instructed in the methodology. A 5-1point score scale was introduced, with 5 maximums and 1 the minimum score.

Table 3: Guidelines for sensory analysis of the formulated cream tested (study based on literature (Piocica et al., 2012, Piocica and Tal-figiel, 2009).

Feature	Description of test procedure	Score (1-5)
Constituency	Place a small amount of the cream on hand. Proceed to analyses its consistency by assessing the ability to keep the cosmetic adhering to the hand.	5- Cosmetic is easy to apply, not flowing. 4- Easy to apply yet flowing can be observed. 3- Cosmetic hard to apply. 2- Too thick to apply 1- Impossible to apply.
Homogeneity	Spread the cream on your hand and assess smoothness of its layer presence of clots or air bubbles.	5 – Completely homogenous no clots, or air bubbles forms a smooth layer on the skin. 4 – Homogenous, no clots and few air bubbles forms an uneven layer. 3 – Observable and palpable clots and air bubbles in the substance and on the skin when applied. 2 - Heterogeneous. 1 – Formulation components are not distributed.
Distribution	Spread the preparation on the forearm skin and observe its resistance to spreading.	5 –No resistance to spreading. 4 – Little resistance to spreading. 3 – Incomplete cover, good spreading. 2 – Difficult to spread. 1 – Impossible to spread.
Smoothing	Apply the formulated cream on the cleaned forearm skin and after an hour appraise the skin's smoothness in reference to a standard to which the substance has not been applied.	5 – Very smooth, soft skin surface. 4 – Smoother and softer skin surfer than reference standard. 3 – The skin surface is as smooth as that of the reference standard 2- Rough skin. 1 – Very rough skin.
Absorption	Apply the substance on cleaned skin and assess the time of its absorption.	5- Very good absorption below 30s. 4 – Good absorption from 30s to 1m. 3 – Average absorption from 1 to 3 min 2 – Poor absorption from 3 to 5 min. 1 – Very poor absorption for more than 5 mins.

Lightening Activity of the Formulated Cream Studies

The number of participants (Table 1) was 60, who were divided into 3 groups, F1, F2, F3 ,F4,F5 and F6(10 people per group). A bottle of cream was given to the participants for 4 week study duration. Participants were asked to apply the cream at the back of their forearm (twice daily). A weekly skin condition assessment was performed on each participant to evaluate the effects of the formulation.

RESULTS AND DISCUSSION

Table 4: Socio-demographic information of the respondents

Biodata	Frequency	Percentage (%)
Sex		
Male	18	10
Female	162	90
Age		
20-30	71	39.4
31-40	44	24.4
41-50	36	20
51-60	29	16.1
Education		
None	26	14.4
Basic	0	0
Secondary	14	7.8
Tertiary	140	77.8
Occupation		
Beauty consultants	4	2.2
Traditional beauty consultants	25	13.9
Others	151	83.9

20-30 years (Table 4) have the highest percentage use of cosmetic plants among the age groups. Most uses plants for acne, skin lightening and hair care. Traditional beauty consultants have much more knowledge on the cosmetic uses of the plants beauty consultants on the other hand have much knowledge about the side effects, synergic reaction of the plants and more efficient ways to use plants for optimal result. Tables 5 – 10 have illustrated various parameters studied.

Table 5: Showing cosmetic plants, uses, plant part used and method of preparation in Katsina State.

Family	Botanical name	Number of citation	Common name	Local name	Plant part used	Method of preparation	Uses	Use value
Meliaceae	*Azadirachta indica*	20	Neem	Bedi	L, S, F	Leaves are grinded to make a paste (fresh or dried), oil is extracted from the flowers and seed.	• Stem used as a traditional tooth brush for teeth whitening. • Paste from the leaves is used to cure acne, pimples, fade dark spots. • Paste from the leaves are used for hair steaming to improve hair growth and to treat dandruff. • Oil from the flowers is used for hair growth, shiny hair and to treat skin infections (eczema)	0.133
Myrtaceae	*Eucalyptus globules*	5	Eucalyptus	Turare	L.	Fresh leaves are boiled in water.	• For facial and body steam to even out complexion and unclogged pores.	0.03
Liliaceae	*Aloe barbadensis*	19	Aloe vera		L	Gel from the leaves.	• For treating dandruff. • For promoting healthy and shiny hair growth. • Treating pimples, acne, fading dark spot.	0.13
Rutaceae	*Citrus limon*	9	Lemon	Lemun tsami	Fr, L.	Juice from the fruit	• For weight loss. • For treating pimples (mixed sometimes with henna). • Fights acne and lighten scars. • For exfoliation (sugar). • Getting rid of blackheads.	0.06
Rutaceae	*Citrus aurantiifolia*	8		Lemun tsami	Fr	Juice	• For weight loss. • Reduces body odour. • Helps eliminate dandruff from hair follicles. • Promotes hair growth, shiny hair • Treat pimples.	0.05
Curcubitaceae	*Luffa aegyptiaca*	8	Lofa sponge	Soso	Fr,	Fruit is dried and peeled.	• For bathing, it exfoliates the skin. • Rejuvenates dull skin for smoother and more youthful appearance.	0.05
Caricaceae	*Carica papaya*	18	Paw paw	Gwanda	L, fr.	Juice from the fruit. Fresh or dried leaves are boiled in water.	• Tea prepared from the leaves is used for weight loss. • Juice from the fruit used for skin lightening.	0.1

Myrtaceae	*Psidium guajava*	7	Guava	Gwaiba	L.	Fresh leaves boiled in water. Fresh leaves are grinded to make a paste.	• Paste from the leaves is used to treat pimples • Faded out dark spot, guava water (boiled) used to promote healthy and rapid hair growth. • It is used for dandruff treatment. • It promotes weight loss.	0.05
Anarcardiaceae	*Mangifera indica*	7	Mango	Mangwaro	L.	Boil leaves Juice extracts.	• Aids weight loss • Fascial cleanser	0.05
Lythracea	*Lawsonia inermis*	13	Henna	Lalle	L.	Fresh, dried leaves paste.	• Decorating hands and legs. • Treatment of pimples and acne scars. • Get rid of body odour. • Promotes hair growth. • Hair dye.	0.09
Moringaceae	*Moringa oleifera*	11	Moringa	Zogale	L, S.	• Boil leaves. • Seeds eaten raw • Paste from leaves (fresh/dried)	• Promotes weight loss. • Treatment of pimple and acne. • Shining hair. • Even out complexion.	0.07
Rubiaceae	*Mitracarpus scarben.*	1		Goga masu	L.	• Fresh leaves paste.	• Treatment of eczema	0.01
Apocynaceae	*Calatropis procera*	2	Sodom apple	Tumfafiya	L, B/b, Fl.	• Paste from the leaves mixed with African black soap. • Bulb and flower boiled with water.	• Treatment of skin rashes, pimples, reduces mouth odour.	0.01
Rubiaceae	*Ziziphus mauritiana*	10	Jujube	Magarya	L, Fr	• Fruit, paste from the leaves.	• For weight loss. • Treat eczema • For glowing skin. • Treats psoriasis. • Cures acne, help prevents appearance of wrinkles.	
Asteraceae	*Vernonia amygdalina*	6	Bitter leaf	Shuwaka	L.	• Fresh leaves, paste	• Glowing skin • Treatment of acne, dark spots and pimples.	0.04
Amaryllidaceae	*Allium cepa*	5	Onion	Albasa	Blb	• Juice extract	• Adds volume to the hair. • Controls hair fall. • Add shine, treats dandruff and itchy scalp.	0.03

Solanceace	*Solanum lycopersicum*	4	Tomato	Tumatir	Fr.	• Juice extract	• Exfoliates the skin. • Brightens complexion	0.03
Myrtaceae	*Eugenia nigersina*	5	Clove	Kanumfari	Fr	• Powdered added to oil.	• To treat hair dandruff • Hair growth • Removes mouth odour	0.03
Alliaceae	*Allium sativum*	4	Garlic	Tafarnuwa	Blb	• Juice extract	• Treats hair dandruff • Pimples	0.02
Zingiberaceae	*Curcuma longa*	9	Tumeric	Kurkur	Fr	• Powdered, juice extract	• Skin lightening	0.05
Arecaceae	*Cocos nucifera*	6	Coconut	Kwakwa	Fr	• Juice extract as oil	• Body moisturizer	0.02
Leguminosae	*Cassia senna*	2	Senna	Hilisko/ sanamki	L.	• Dried leaves	• Weight loss	0.01

KEY: L - Leaves, Fr - Fruit, Blb - Bulb, Fl - Flower

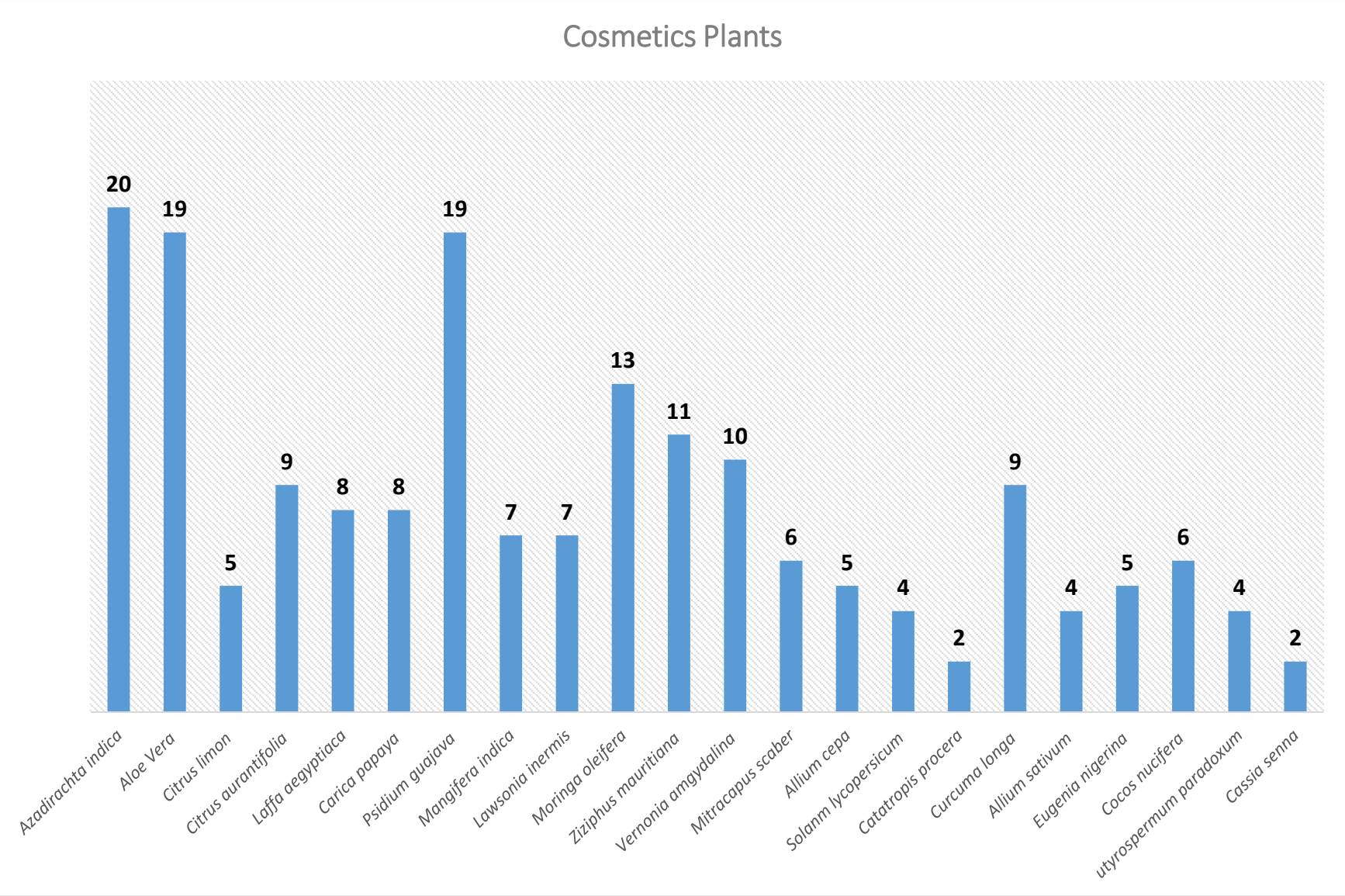

Figure 2: Cosmetic plants

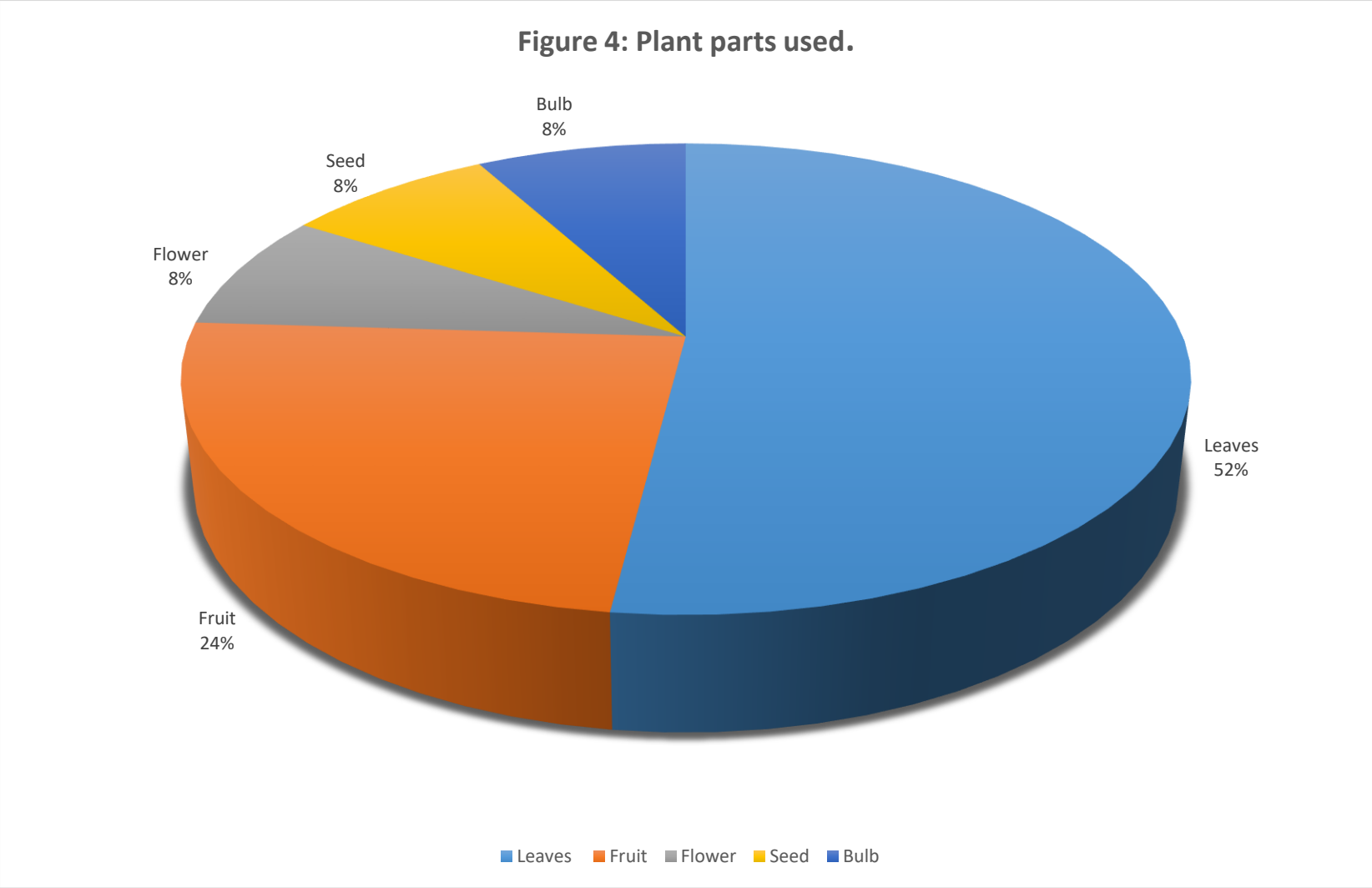

Figure 3: Plant parts used.

Table 6: Organoleptic properties of the poly herbal Lightening formulations

Parameters (Colour and odour)	**F1 Characteristic**	**F2 Characteristic**	**F3 Characteristic**	**F4 Characteristics**	**F5 Characteristic**	**F6 Characteristics**
pH	4.7	4.6	6.9	6.2	6.4	6.8
Washability	Washable	Washable	Washable	Washable	Washable	Washable
Grittiness	No gritty particles	No gritty particles	No gritty particles	Small gritty particles	Small gritty particles	Small gritty particles

Table 7: Shows lightening activity of the formulations

Formulations	1 week	2 week	3rd week	4th week
F1	-	-	-	-
F2	-	-	-	-
F3	-	-	-	-
F4	-	-	-	-
F5	-	-	+	+
F6	-	-	-	-

Key + = Presence of lightening activity.
- = Absence of lightening activity.

No lightening activity was observed in 5 formulations (F1, F2 F3 ,F4,F6) lightening activity was observed in F5 formulation in the third week of use.

Table 8: Stability of the poly herbal Lightening formulations

Formulations	1 week	2 week	3rd week	4th week
F1	- COT	- COT	+ COT	+ COT
F2	- COT	- COT	+ COT	+ COT
F3	- COT	- COT	+ COT	+ COT
F4	- COT	- COT	- COT	- COT
F5	- COT	- COT	- COT	- COT
F6	- COT	- COT	- COT	- COT

Key: + COT = Change in colour, odour and texture.
- COT = No change in colour, odour and texture.

Formulations (F4,F5,F6) were stable with no change in colour ,odour texture and there is no separation of excipients. F1,F2,F3 formulations were stable for 14days .

Table 9: Safety testing results of the formulations

Formulations	Irritation	Redness	Swelling
F1	-	-	-
F2	-	-	-
F3	-	-	-
F4	-	-	-
F5	-	-	-
F6	-	-	-

All formulations were safe No irritation, no erythema ,no Edema.The excipients in the formulations are 100% natural that had been proven safe.

Table 10: Showing sensory evaluation of the formulations. F4 obtained the highest average score, F3 is the least satisfying (3.8).

Parameters	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**
Consistency	4.6	4.4	3.8	4.8	4.8	4.8
Homogenity	4.5	4.4	3.6	4.8	4.7	4.0
Distribution	3.8	3.8	3.9	4.7	4.3	4.7
Smoothening	4.6	4.3	4.0	5.0	4.7	4.5
Absorption	4.0	3.9	4.2	4.8	4.0	4.0
Average	4.3	4.2	3.9	4.8	4.5	4.4

Generally, all emulsions had a regular homogenous structure, good rate of absorption, smoothing effect .Emulsions F4 and F5 obtained the highest average score of all assessed parameters. Emulsion F3 has the lowest average score.

Discussions

A total of 150 informants were interviewed, 132 women (88%), 18 men (12%) ranging from 20-60 years. More women were interviewed than men, but it was not intentional. It is a

fact that essentially women prepare and use cosmetic receipts. Body care seems to be fundamentally a concern among women either for the wellbeing of their children or themselves.

Most informants learn the knowledge of use of cosmetic plants on the internet through DIY images and videos (Do It Yourself), homemade recipes shared on the net and other from elders at home. Informants with tertiary education have the highest frequency (82%) and this is because they use internet and social media.

Traditional beauty consultants have much more knowledge on the cosmetic uses of plants; beauty consultants on the other hand have much knowledge about the side effects, possible interaction of the plants with other plants, and more efficient ways to use these plants for optimal result.

The informants prefer the use of plants for cosmetic use than the use of synthetic products from the market due to fear of side effects. A total of 18 plants were recorded to be used for their cosmetic values.

A comparison of this study with ethnobotanical surveys on plants used in beauty care among the Fulanis in Wamakko Local Government Area of Sokoto State. The morphological parts used were similar with those mentioned in this study (leaves, flowers, seeds). Furthermore, some of the species identified in this study: *Azadirachta indica, Psidium guajava, Magnifera indica, Aloe ziziphus jujube, lawsonia inermis* were also reported by (Dodo, 2020).

Other ethnobotanical studies on cosmetic plants have identified *Moringa oleifera, Carica papaya, Vernonia amygdalina, Allium cepa* as source of traditional cosmetics in the South West Nigeria (Ghemisola, 2015). A further comparism of this study with other studies in Nigeria, Pakistan, Italy as well as Asian and Sahrawi showed some similarities, *Magnifera indica* and *A.vera* extracts reported in this study as facial cleanser, acne treatment, dandruff treatment respectively.

Azadirachta indica have been used traditionally for treating several epidermal dysfunctions, such as eczema and acne. It is rich in antioxidants and helps to boost immune response in tissues of affected skin area. It also consist of bioactive compounds for antibacterial, antifungal and anti-cancer activities (Azilah, 2019). *Carica papaya* leaf contains many nutrients such as Vitamin C, Vitamin A, beta-carotene and protein. It also has minerals like calcium, iron, magnesium, zinc, selenium and phosphorous. Papaya leaf is known to speed up the breakdown of fats in the body, helping support healthy weight levels (Shahzad, 2022). Loofah sponge is composed of slightly rough fibers that are very helpful to exfoliate skin, it eliminated dead skin cell (Ebanel, 2020).

A comparison of this study with formulation and evaluation of Alpha Arbutin skin lightening cream using polyarylate base by cold press (Yozali, 2018), shows similarities in terms of the cream stability and safety testing. In both studies F1 and F2 formulations experienced physical changes in third week. Methylparaben and polyparaben are not used in both studies. All formulations tested were safe on skin with no skin irritation.

Further comparison of this study with formulation and evaluation of poly herbal cosmetic cream using *Curcuma longa, Aloe vera, Camellia sinensis* (Grace, 2014) shows similarities in pH of the formulations, consistently and washablity. in both studies, the pH value of the formulations ranges from 4 to 6.9. All the formulations consistency are good and washable.

Another comparison with formulation and evaluation of anti-aging poly herbal cream with Neem oil, purica extract, eucalyptus oil shows some similarities in pH. All the pH values of the formulations ranges from 4 to 6.9.

Present study was aimed at preparing best natural polyherbal cream for skin lightening using *Cucurbita pepo* extract and *Curcuma longa* extract. The plants were extracted using two methods, solvent extraction using ethanol for the powdered extract and cold press method used for the oil extraction.

Most reviewed journals on formulation of polyherbal cream uses propylene glycol (as humectant to enhance the appearance and moisture retention distribution of the cream), methyl paraben, propylparaben (as preservatives). Triethanolamine as a pH adjuster. Unfortunately, all these are synthetic chemical that has an adverse effect in the skin and body. All these are toxic chemicals contained in our daily cosmetic products that are designed to be specifically be applied to the skin and can result to long term side effects.

Cocoa butter is used in the formulation (5%) to enhance the moisturizing effects, after feel effect of the formulate cream. Vegetable glycerin is used to replace both propylene glycol, methylparaben propylparaben as a preservative and a humectant.

Plates 3 – 11 illustrates the behaviour of the formu;ations. The first formulation (solvent extraction) F1, F2, F3. The second formulation F4, F5,F6 (cold press method)

Formulations F1, F2, F3 colour was deep yellow, and they had a characteristics odor, there is no gritty particles. Formulations F4, F5, F6, colour had a bright yellow colour, characteristic odour and there is presence of some gritty particles.

All the developed formulations showed excellent homogeneity and there were no lumps in the formulations. The pH values of the formulations ranges from 4-7.0 which is considered as normal pH.

There was absence of lightening activity in F1, F2, F3, and F6 formulations. F5 formulation (75% turmeric oil, and 25% pumpkin oil extract) lightening activity observed in the 21 days.

All the developed formulations were observed for change in colour, odour, texture . F4, F5, F6 formulations were stable with no change in colour, odour, texture . F1, F2, F3 formulations were stable for 21 days (3 weeks) in the 4th week of formulation, changes in colour, texture and odours were observed.

Generally, the respondents concluded that all emulsions had a regular, homogenous structure, good rate of absorption, smoothing effect. Emulsions F4 and F5 obtained the highest average score of all assessed parameters. Emulsions F3 have the lowest average score.

All formulations were safe and do not irritate the skin. This was evidenced by the absence of irritation, burning, itching, swelling, or pain on the skin of the volunteers. This was because the ingredients in the formulation are 100% natural that had been proven safe.

Plate 3: F1 Formulation

Plate 4: F2 Formulation

Plate 5: F3 Formulation

Plate 6: F4 Formulation

Plate 7: F5 Formulation

Plate 8: F8 Formulation

Plate 9: Formation process

Plate 10: *Curcuma longa* extract

Plate 11: *Cucurbita pepo* oil extract

CONCLUSION

The use of plants of treating disease is as old as the human species. Popular observation on the use and efficacy of medicinal plants significantly contribute to the disclosure of their therapeutic properties, so that they are frequently prescribed, even if their chemical constituency's are not always completely known. For example, *Senna alata* is used traditionally in Nigeria to treat bacterial and fungal infections. They also showed varying degrees of antibacterial and antifungal activities against pathogens. In West Africa, mostly in Nigeria, medicinal plants have shown distinctive features in area of herbal therapy. There are about 1,000 medicinal plants in Nigeria and most of their medical activities have not been investigated yet. Their medicinal activities could be decisive in treatment of present or future health problems. Some medicinal plants can complement or damage or neutralize their possible negative effects in the body, and they are known as *synergic* medicinal plants; some have ability to prevent the appearance of some diseases by reducing the side effects of synthetic treatment, these are known as preventive medicinal plants.

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